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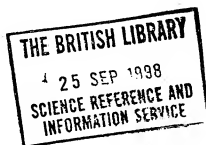
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(54) Title                      Method of cleaning liquid supply pipes and apparatus therefor

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METHOD OF CLEANING LIQUID SUPPLY PIPES AND APPARATUS THEREFOR

Field of the Invention

15 This Invention relates to a method of cleaning liquid supply pipes and apparatus therefor, in particular it relates to removing sludge from water supply pipes to buildings.

Background of the Invention

20 The supply of water to buildings, for example a dwelling house comprises, typically, a branch pipe leading from the water mains to the premises. A stopcock is provided intermediate the branch pipe and the house's water supply. The branch pipe may become clogged and will require cleaning or scouring either between the stopcock and the  
25 premises and/or between the stop stock and the mains supply.

If there is an obstruction in the pipe, the usual procedure is for the local water authority to check the stopcock to see whether water is flowing through it. If it is, then this suggests that the obstruction  
30 is in the portion of the branch pipe between the stopcock and the premises (the downstream pipe). If there is no water flow through the stopcock, then the obstruction is in the other part of the pipe leading to the main supply (the upstream pipe). In either case it is usual to dig up and replace the obstructed portion of pipe. Another possibility  
35 is to dig down to expose the pipe, turn off the water supply by means of the stopcock if the obstruction is between the stopcock and the premises; fit a T-piece to the pipe and direct pressurised air into the

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- pipe through the T-piece. However, this is a time consuming and labour intensive operation, and the system does not have flexibility in terms of control of air/water flow direction and volume. Accordingly, it is not much used, and as mentioned above, the usual arrangement is to replace the obstructed portion of piping.

### Object of the Invention

- The invention seeks to overcome the problem and to provide a method and apparatus for conveniently cleaning or scouring a liquid supply pipe, especially a water supply pipe.

### Summary of the Invention

- According to the present invention there is provided a method of cleaning liquid supply (upstream) and/or delivery (downstream) pipes attached to a stopcock which comprises providing the stopcock with a valve assembly having means to supply a gas at elevated pressure into either the downstream or upstream supply pipe and means to automatically prevent the flow of liquid through the stopcock while said pressurised gas is flowing.

- The pressurised gas will tend to remove any accumulated dirt or sludge from the pipe thus scouring it. The present invention is particularly suitable for scouring water supply pipes from the public water supply mains to buildings, e.g. domestic buildings.

- The present invention also provides a valve assembly, for insertion into a stopcock body, having pressurised gas inlet means and means to prevent liquid passing through the stopcock into either the downstream or upstream pipe while the pressurised gas is flowing.

- In a preferred embodiment the valve assembly has reciprocating valve means which permits alternate flows of pressurised gas and water through the obstructed pipe. The specific description below concerns the pipes of a typical water supply to a dwelling house.

In operating one embodiment of the present invention, when there is an

obstruction in a water supply pipe, the stopcock is exposed. It is usually located in a small manhole, and it may be necessary to excavate around the stopcock to fully expose it. If the stopcock is old (i.e. more than thirty years old) it is advisable to replace the stopcock completely. This is done by closing the existing old stopcock and fitting a new one along side. If the stopcock is a relatively new fitting which is to be retained, then the supply pipe on the main supply side of the stopcock is frozen, to prevent water flow through the stopcock. The existing body of the stopcock is removed and a valve assembly of the invention is fitted. The water pipe is then allowed to thaw and scouring of the pipe can then commence. A hose is connected, preferably by means of a QCDC (Quick Connect-Disconnect Coupling) to the top of the valve assembly and other end of the hose connects to an air compressor or a pressurised gas supply (e.g. a nitrogen cylinder) if it is inconvenient to use a compressor via an air-flow control gun. Preferably the valve assembly has, attached to its gas inlet means, a Y-piece assembly having a pressurised gas inlet means, a water inlet means, an outlet means and valve means to prevent back flow through the two inlet means.

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#### Brief Description of the Drawings

The invention is illustrated in the accompanying drawings in which:

25 Fig 1 is an elevation view of a valve assembly according to the present invention,

Fig 2 is an elevation view of an alternative form of valve assembly according to the present invention,

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Fig 3 is is an elevation view of a Y-piece which can be used in the present invention.

Fig 4 is an elevation view of a stopcock into which the present valve assembly may be inserted,

A valve assembly suitable for the present invention is shown in Fig 1 of the accompanying drawings while a typical stopcock without the customary on/off tap mechanism is shown in Fig 4 which comprises the interior threaded portion (40), a water input (41), an aperture (42)

through which the supply flows when the stopcock is open exit for the liquid (43). In Fig 1 the valve assembly body (1) comprises a flange (2) with an associated sealing washer (3), a threaded portion (4) adapted to fit the internal thread of the stopcock (not shown), a  
5 reciprocating valve (5), comprising a reciprocating guide spindle (6), a sealing washer (7) and a gap (8) for air flow, moveable within the on/off threaded portion (12) which automatically controls alternating flows of air and water. The assembly has an input pipe (9) preferably provided with a QCDC connector (10) seated into the valve assembly body  
10 via a normal packing gland (11).

The reciprocating guide spindle (6) can be forced down towards the input aperture (42) under the influence of the pressurised gas thus sealing it with sealing washer (7). A gap (8) allows the passage of the  
15 gas into the downstream supply pipe (not shown).

As an alternative to the illustrated valve guide (6) it would be possible to extend the central spindle fully with a stopper at its bottom end, and provide holes in the spindle walls instead of the slots  
20 to allow air flow to the service pipe.

In the operation of a typical embodiment, a compressed air supply is connected to the valve assembly (1) via an operating gun and a QCDC connector. The gun is operated to inject pressurised gas into the  
25 system. The gas pressure is monitored using a pressure gauge to avoid excessive pressure on the supply pipe. Before the air pressure is applied the mains water pressure pushes the reciprocating valve upwardly to permit water flow into the service pipe being cleaned. As the gun is operated, pressurised air causes the reciprocating valve to  
30 close preventing water flow into the pipe, but allowing air-flow. By repeating operation of the gun (that is holding trigger of the gun, for 3-5 seconds, and then releasing the trigger for 3-5 seconds) alternate pulses of water and air are directed into the pipe being cleaned. Because of the air pressure, the water "slugs" are forced through the  
35 pipe at high velocity to give the cleaning action. Repetition of the procedure for 8-10 times is usually sufficient to clean the pipe. An alternative valve assembly is shown in Fig 2 is identical to that shown in Fig 1 except that the reciprocating valve is replaced by an

extended stop (20) with a sealing washer (21) allowing the pressurised gas into the upstream supply pipe leading to the water main but not into the downstream pipe.

- 5 In a third alternative the reciprocating valve is dispensed with allowing pressurised air to flow in both directions. This however is not considered to be best practice.

An optional further part of the assembly is the Y assembly shown in Fig 10 3 comprising a pressurised air input (30) and associated pressure gauge (31), a water input (32) and an outlet (33), preferably fitted with a QCDC device for connection to the valve assembly of Figs 1 or 2. The water fed to the input (32) may be from the mains or from an independent source of water. Non-return valves (34 & 35) are fitted to 15 both inputs. A globe valve (not shown) and operating lever (36) is provided to isolate the additional water supply from the valve assembly when required. The direction of flow is indicated by arrows. The purpose of the Y assembly is:

- 20 1) to allow rapid control of water/air to stopcock assembly;
- 2) to provide for an alternative water supply other than mains;
- 3) to provide for instant supply of air and water;
- 25 4) to provide ease of operation; and
- 5) to prevent air and water mixing.
- 30 If it is necessary to use a supply of water other than the mains supply connected to the stopcock, a hose-pipe is connected to the arm (32) of the Y-piece to receive a supply of water from another source. The Y-piece configuration is designed to ensure that the air-flow is in the desired direction of flow only. To ensure this, non-return valves 35 (34 & 35) are provided on each arm of the Y-piece to prevent backward flow of water either to the air system or to the water supply system.

CLAIMS

1. A method of cleaning liquid supply (upstream) and/or delivery (downstream) pipes attached to a stopcock which comprises providing the stopcock with a valve assembly having means to supply a gas at elevated pressure into either the downstream or upstream supply pipe and means to automatically prevent the flow of liquid through the stopcock while said pressurised gas is flowing.
2. A valve assembly, for insertion into a stopcock body having connected thereto supply (upstream) and delivery (downstream) pipes, having pressurised gas inlet means and means to automatically prevent liquid passing through the stopcock into either the downstream or upstream pipe while the pressurised gas is flowing.
3. A valve assembly as claimed in claim 2 in which the valve assembly has reciprocating valve means which permits alternate flows of pressurised gas and water through the obstructed pipe in response to changes in gas pressure within the stopcock.
4. A valve assembly as claimed in claim 2 or 3 which has, attached to its gas inlet means, a Y-piece assembly having a pressurised gas inlet means, a water inlet means, an outlet means and valve means to prevent back flow through the two inlet means.
5. An apparatus as claimed in claim 2 substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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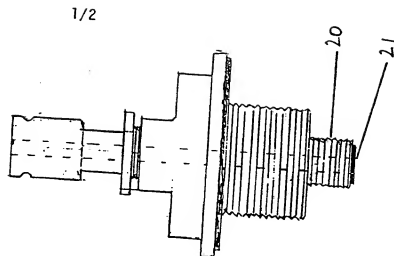


FIG 2

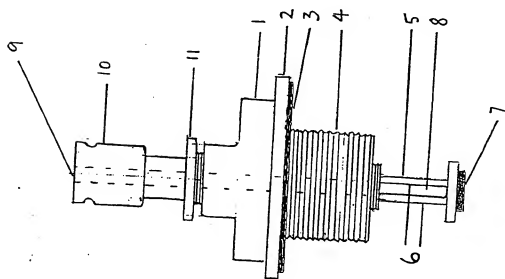


FIG 1



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